control point SCP of an intelligent network. The home location register HLR and the visitor location register VLR comprise information on mobile subscribers. the home location register HLR comprises information on all subscribers in a mobile network and the services they subscribe to, and the visitor location register VLR comprises information on mobile stations visiting the area of a certain mobile switching centre MSC. A connection to a serving node of a packet radio system 3G-SGSN (Serving GPRS Support Node) is formed through an interface Gs' and to a fixed telephone network PSTN/ISDN through a gateway mobile switching centre GMSC (not shown). A connection from the serving node 3G-SGSN to external data networks PDN is formed through an interface Gn to a gateway node GGSN (Gateway GPRS Support Node) which has a further connection to the external data networks PDN. The connection from both the mobile switching centre 3G-MSC/VLR and the serving node 3G-SGSN to the radio network UTRAN (UMTS Terrestrial Radio Access Network) is set up through the interface Iu. It should be noted that the UMTS system is designed in such a manner that the core network CN can be identical to the core network of a GSM system, for instance, in which case there is no need to rebuild the entire network infrastructure.

[0035] The UMTS system also comprises a packet radio system which is to a large extent implemented according to a GPRS system connected to a GSM network, which explains the references to a GPRS system in the names of the network elements. The UMTS packet radio system can comprise several gateway and serving nodes, and several serving nodes 3G-SGSN are typically connected to one gateway node 3G-GGSN. Both nodes 3G-SGSN and 3G-GGSN function as routers supporting the mobility of a mobile station, which routers control the mobile system and route data packets to mobile stations regardless of their location and the used protocol. The serving node 3G-SGSN is in contact with a mobile station UE through the radio network UTRAN. A task of the serving node 3G-SGSN is to detect mobile stations capable of packet radio connections in its service area, to transmit and receive data packets from said mobile stations and to track the location of the mobile stations in its service area. Further, the serving node 3G-SGSN is in contact with the mobile switching centre 3G-MSC and the visitor location register VLR through the signalling interface Gs' and with the home location register HLR through the interface Gr. Records related to

packet radio services and comprising subscriber-specific packet data protocol contents are also stored in the home location register HLR

[0036] The gateway node 3G-GGSN acts as a gateway between the UMTS network packet radio system and the external data network PDN (Packet Data Network). External data networks include the UMTS or GPRS network of a second network operator, the Internet, an X.25 network or a private local area network. The gateway node 3G-GGSN is in contact with said data networks through the interface Gi. Data packets being transmitted between the gateway node 3G-GGSN and the serving node 3G-SGSN are always encapsulated according to the gateway tunnelling protocol GTP. The gateway node 3G-GGSN also contains PDP (Packet Data Protocol) addresses of the mobile stations and routing information, i.e. 3G-SGSN addresses. The routing information is thus used to link the data packets between the external data network and the serving node 3G-SGSN. The network between the gateway node 3G-GGSN and the serving node 3G-SGSN employs an IP protocol, preferably the IPv6 (Internet Protocol, version 6).

[0037] Figures 4a and 4b show UMTS protocol stacks used for control signalling (control plane) and user data transmission (user plane) in a packet radio service of the UMTS system. Figure 4a shows the protocol stack used for control signalling between a mobile station MS and the core network CN. Mobility management MM of the mobile station MS, call control CC and session management SM are signalled on the highest protocol layers between the mobile station MS and the core network CN in such a manner that the base stations BS and the radio network controller RNC located in between are transparent to this signalling. Radio resource management of radio links between mobile stations MS and base stations BS is managed by a radio resource management system RRM which transmits control data from a radio network controller RNC to base stations BS. These functions related to the general management of a mobile system form a group called core network protocols (CN protocols), also known as Non-Access Stratum. Correspondingly, the signalling related to radio network control between a mobile station MS, a base station BS and a radio network controller RNC is done on protocol layers called radio access network protocols (RAN protocols), i.e. Access Stratum These include transfer protocols on the lowest level and the control signalling transmitted by the transfer protocols is transferred to the higher levels for further processing. The most essential of

the higher Access Stratum layers is the radio resource control protocol RRC which is responsible for establishing, configuring, maintaining and releasing radio links between the mobile station MS and the radio network UTRAN and for transmitting control information from the core network CN and the radio network RAN to the mobile stations MS. In addition, the radio resource control protocol RRC is responsible for allocating enough capacity for the radio bearer according to the instructions of the radio resource management system RRM in application-based capacity allocation, for instance.

[0038] A protocol stack as shown in Figure 4b is used in transmitting UMTS packet-switched user data. On the interface Uu between the radio network UTRAN and a mobile station MS, the lower-level data transmission on a physical layer is performed according to a WCDMA or TD-CDMA protocol. A MAC layer above the physical layer transmits data packets between the physical layer and an RLC layer and the RLC layer handles the logical management of the radio links of different radio bearers. The RLC functions comprise for instance segmenting the user data (RLC-SDU) being transmitted into one or more RLC data packets RLC-PDU. IP header fields in data packets (PDCP-PDU) of a PDCP layer above RLC can optionally be compressed. After this, PDCP-PDUs are forwarded to RLC and they correspond to one RLC-SDU. The user data and the RLC-SDUs are segmented and transmitted in RLC frames, to which address and verification information essential for data transmission is added The RLC layer also takes care of re-transmission of damaged frames. The serving node 3G-SGSN manages the routing of the data packets coming from the mobile station MS through the radio network RAN on to the correct gateway node 3G-GGSN. This connection uses the tunnelling protocol GTP which encapsulates and tunnels all user data and signalling transmitted through the core network. The GTP protocol runs on top of the IP used by the core network.

[0039] Figure 5a shows an functional model of the PDCP layer, in which one PDCP entity is defined for each radio bearer. Since in the present systems, an individual PDP context is defined for each radio bearer, one PDCP entity is also defined for each PDP context, and a certain RLC entity is defined for each PDCP entity on the RLC layer. As stated above, the PDCP layer can in principle also be functionally implemented in such a manner that several PDP contexts are multiplexed on the PDCP layer, in which case on the